environment and find "clean" spectrum; resize the affected channel; dynamically increase or decrease bandwidth; move the channel to a new carrier frequency; allocate and additional channel; move one or all cable modems from one channel to another without registering. Because the modems can be dynamically switched without having to re-register, the integrity of service level agreements are preserved for mission-critical services such as VoIP calls and symmetrical business services.

<u>Reconstruction of Legacy Upstream Channels at the Head End</u>

[0096] In order to assure proper demodulation of the legacy return signals, it is necessary to reconstruct each upstream signal precisely at its original carrier frequency. Fig. 10 provides detail of this process. The context for these functional blocks includes Fig. 9 and Fig. 7A.

[0097] Reconstruction of the original signal requires performing steps that are the reverse of the sampling and decimation process performed in the mini-CMTS of the eFN. Based on information either known in advance (e.g., the decimation ratio provisioned for the channel) or included in the Ethernet encapsulated frames (the eID, CID, CTRL and SEQ parameters; describing the upstream signal origin, BW and frequency), it is straightforward to reconstruct and upsample to generate an exact replica of the digitized sample stream provided to the front-end of the eFN's mini-CMTS.

[0098] These samples are fed into a D/A converter whose clock is running synchronously to the A/D converter in the eFN. The reconstructed signal is thus placed precisely on the proper carrier frequency. The required clock synchronicity can by achieved by a number of means, including e.g. FIFO fullness control and timestamp messaging. The particular method of clock synchronicity is determined at least in part by